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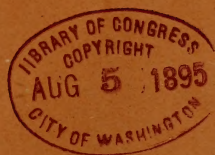
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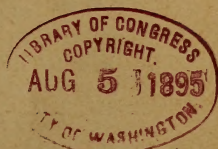
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ENSILAGE BOOK,

CONTAINING PRACTICAL AND
USEFUL INFORMATION ON



Ensilage and Silos. *31061 aa'*

PUBLISHED BY

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SPRINGFIELD, OHIO.

1895.

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To Our Friends and Patrons.

WE have been solicited to put out a book on Ensilage that will be more complete in detail and give plainer and more definite information regarding ensilage and silos than anything that has ever been put on the market. We are always ready to respond to such calls, but it is with a good deal of apprehension that we undertake the work. We have a good many agents who are selling our goods in territory where there is comparatively no ensilage used and very few silos built. They want a book giving details, without too much description, so that farmers can go to work readily and understandingly, and build their silos and put in their ensilage in the proper way. Most books on this subject are too elaborate; they give a good deal of information that is not necessary, and a good many details that they should give are left out. We fully realize the fact that farmers must have explicit directions for building silos, especially in territory where no silos have been built, and they know little or nothing about the details or arrangements of them. A good many farmers have had our book on ensilage, which we have considered very complete, but they write us a great many letters asking questions that should have been taken care of in our book. When we issued our last book on ensilage we considered that if we got the details and letters from farmers direct, we would have the matter in just the right shape for farmers to get the information they needed; but it is a pretty hard matter to write or describe these details so that everybody will find the information that they want. Taking up the subject of ensilage, we find that there

are thousands of farmers throughout the United States who have not the least idea what ensilage is. They do not know that there has ever been such a food put up or used, and these same farmers stand just as much in need of this food for their stock as people who are using the most. We find another class of people who have heard and read a good deal about it, but do not believe it is a success. They think that it is but an experiment. We have letters every day from farmers saying that if they were sure that ensilage would be a success, or if it had been tested so that they could believe it was a success, they would put in a silo. Others write us that some one man perhaps is going to put in a silo, and want us to furnish machinery, and help them all we can, so that it can be demonstrated and tested. All of these points are interesting to most farmers, and we give them in our book to show the farmers throughout the country that their brother workers are not up with the times, and that there can be a good deal of work done among them to help improve their situations and bring them up to the times in modern farming. We want to carry out our first idea in this book—make it short, but interesting and valuable, and will therefore go more particularly into the construction of silos and the use of ensilage. We shall write a good many things in this book that will not be of any value whatever to people who have used ensilage or know anything about it, but we shall endeavor to reach more particularly the farmers who are interested, but know nothing comparatively about the system. We shall publish a few of our best letters from users of ensilage, showing what the results have been, and these letters we will assure our friends can be relied upon. Corn ensilage is the best of all in most sections of the country. In the South they use pea vines and maize, and clover to some extent, but all through the Eastern and Middle States corn ensilage is universal. Corn should be allowed to stand until the ears are in the roasting state and the kernels glazed. At one time it was considered best to have the corn cut in the green state, just as the ear was forming, but we find now that the best results are obtained

from ensilage that has reached that state of maturity where the ears become glazed. The stalks are then run through the feed cutter, cutting up the stalks, ears and all. A good many, however, have taken the ears off and used the stalks only. Most of our friends use regular ensilage corn, as they get a larger tonnage to the acre, and they think get better results. The corn is planted in rows, cultivated both ways. However, a good many think they get better results by drilling their corn, cultivating one way. We have a good many customers that use common corn, but it is a question in our minds whether they get the amount that they ought to or do as well as they would to use the regular fodder corn, getting the height and making a large yield.

SILOS.

The best and most satisfactory place to build a silo is in the bay of a barn and in a corner, using the wall on two sides for the silo, and building a wall on the other two sides, say 3 to 4 feet above ground. This wall need not be over 1 foot to 18 inches thick for a moderate-size silo, but it should be built solidly and securely. A good plan is to put anchor irons into this wall, so as to hold the timbers of the silo from sliding or getting out of place. These timbers should be wide enough so that there can be placed around the outside edge a 2-inch rib, 1 inch thick, leaving room for the uprights to butt back against this rib, so there is no possible danger of a side thrust throwing these uprights out of place. These uprights on a 100 to 150 ton silo, running 15 to 20 feet deep, should be 2 x 8, and should be from 1 foot to 18 inches apart, according to the height and size of the silo. The corners should be lapped, so that there can be no possible chance of their spreading at the corners. This is a vital point in a silo, and if the corners are not well sustained, frequently they spread, let the air in, and spoil a good deal of ensilage. After the uprights are put in place the side-boards are put on, running horizontally around the silo, breaking joints and lapping onto the corners, so as to hold

the silo securely from spreading. The two joists at the corner can be nailed through, one to the other, so that it forms just the same effect as a timber set in the corner with one-quarter out, leaving say 2-inch opening one way and one the other, so as to nail the ends of the boards in. The boards used for the first course, being put on horizontally, should have square edges, but need not be matched or planed. After it is boarded up in this way a tar or rosin paper can be put on inside, covering the whole silo, and then matched pine or spruce, or something of this nature, nailed on up and down. This is an advantage, as the grooves will not hold the moisture, and boards are not so liable to rot as when the grooves run the other way, holding all this juice of the ensilage and decaying the lumber. A good many farmers put a coat of tar, or something of this kind, over the last coating of boards, but this we do not consider necessary, as a silo will last a good many years without this. When all is finished the inside boarding should be flush with the inside of the wall all around. The two walls belonging to the barn have to be brought out according to the construction of the barn, so as to bring the whole silo flush with this wall. In most barns the uprights are small and are not secure, and it is necessary to put the uprights on all four sides to make it secure. It is a good idea to have a few loose cobble stones around in the bottom of the silo, and over this put a cement coat of about 2 inches. After this is dry the cement wash used around on the wall and in the edges of the cement flooring will fill all the cracks and make the silo air-tight. Portland cement is the best, but Akron cement is used a good deal. There are different kinds, but it pays to use a good cement for the bottom. In filling the silo great care should be used in distributing the cut ensilage, so as to have it pack evenly all around the edges and in the center. It usually packs harder where the ensilage drops, and if a good deal of care is not taken it will not press down evenly. It should be pressed and trodden very thoroughly around the edges and in the corners, and distributed so that the cut corn, that is, the

ears, will be evenly divided and distributed among the cut stalks. It is a good idea in filling a silo to cut, say one-half day, and then let it settle and cure a half day, or if two silos are being filled at once, fill one one day and one the other up to a certain point, giving it a chance to heat and cure, as this makes the best and sweetest ensilage. After the silo is filled it is well enough for it to remain uncovered for a day or two, and to be trodden and distributed so as to have it perfectly even. Then, after it is refilled to the right point, put some loose or cut straw to the depth of a foot on top, put on the covers and weight it. A solid cover, if it can be handled by pulley and rope, is the best and most satisfactory, as it can be held by this same rope when it is being taken out. A good many farmers do not approve of weighting ensilage, but we have never known of any bad results to come from it, and we have known of bad results coming from not being weighted. A good idea of doors is to have one above the other all the way up, so that any door in the silo can be opened to take ensilage from. A good many commence at the top, others open the bottom door and undermine, care being taken that the cover is secured, so that it will not fall, and the weights properly adjusted.

A good deal of this information will not be needed by a good many farmers, but there are a good many other farmers that will appreciate, perhaps, some of these facts, and we hope they will aid them in building their silos.

FEEDING ENSILAGE.

We find upon investigation and from our conversations with different feeders of stock, that they do not agree on the amount to be fed, but a fair average is about 40 pounds to the animal per day, divided into two rations, morning and evening, with dry fodder of some kind at noon, hay having the preference. On new milch cows this is fed with a grain ration, but as all farmers have their own ideas of feeding or can get what information they need from other sources, we think it would not properly come in place here. A grain

ration should be fed in about the same quantity when feeding ensilage as when feeding dry fodder. On young stock and dry cows this ensilage can be fed twice a day with good results and without any grain ration whatever. Cattle will do splendidly on ensilage fed twice a day with loose straw at noon. We have seen some of the most excellent stock fed in this way and our experience in feeding ensilage has also been, that there is nothing better for young stock than two rations of ensilage without any grain and with small amount of hay or straw for the noon meal. They grow very fast and do well in every respect. We have, we think, called attention, in the previous part of this book, to the necessity of keeping barns or stables warm or comfortable where ensilage is fed. Animals feel the cold very much more when fed on ensilage than on other kinds of fodder, and not only this, the ensilage does not have as good an effect. We would like to induce all of our farmer friends to make one experiment with ensilage. If they do not buy an Ensilage Cutter and we knew they were not going to buy, we would want them to try the experiment just the same. There are some farmers who put their ensilage in without cutting and advocate it, but we are under the impression that no farmer would put his ensilage in whole if somebody would furnish the cutting apparatus and pay the extra expense. There may be a trifle extra expense in putting ensilage in cut, but the convenience in getting at it and the expense saved in handling it, when being fed, is so much less that it pays to cut it. Not only this, but a farmer, having ensilage or not, needs a Cutter just the same. He should cut up his hay and dry fodder or straw. Speaking of cutting fodder, etc., this we think is a good place to recommend to farmers the advisability of cutting straw for bedding. It distributes very much better, the waste is much less, and we think it makes a great saving, allowing the farmer an extra amount of straw to use. We have had some experience and have had a good deal of contact with farmers, and we find also that cut straw makes a very good ration. We know a good many farmers who feed nothing but straw all through the winter,

with grain of course, and their stock does very nicely. We, however, do not recommend the entire feed of straw and we do not think our best farmers would recommend it, but we give this information as it comes to us, so that if there is any value in it our farmer friends may have it. It is not necessary for farmers to go into ensilage in an expensive way to experiment with it. A few dollars will build a small silo and farmers can put in enough to test it. Even 2 or 3 tons would do. Pack it in thoroughly and nicely and after it has lain about six weeks, take it out and feed it. It will be a very easy matter for any farmer to satisfy himself whether ensilage is a success or not. If he gets better results from it in comparison with other manners of feeding and finds it cheaper, why he knows himself then what it is. It has been demonstrated in a great many ways and we have yet to come across any farmer who has not been well pleased and perfectly satisfied with the experiments in ensilage.

OUR SILO PLAN No. 2.

This is a method that is in quite good favor among a good many farmers. We are not sure but what it is a good plan and perhaps a good many of our friends would think better of it than of our plan No. 1. The wall and foundation for plan No. 2 would be built the same as No. 1. 2x8's are then used, laying them on the wall and lapped over and nailed down through the corners so as to make it secure, and then putting the corner pieces across, say 2 to 3 feet from each end, so as to make almost an octagon shape silo. This would form the frame for the bottom or wall, then another frame is built in the same way and is raised about 2 feet. This is held in position until the boards can be nailed into the bottom frame and to the next one so as to hold it in position and then another frame still above until it reaches the top. These frames or surroundings can be put on as close together as necessary, but $1\frac{1}{2}$ to 2 feet is plenty near enough and makes a very strong silo. On very large silos these will have to be lapped,

of course, in the center so as to reach. This first course of boards may be rough stuff, square edges and then a coating of tar paper can be put on, and then matched boards or ceiling used on the inside covering the tar paper. This ceiling is a good many times put on horizontally, but if it can be put on to avoid the joints in the other boards, it is better to put it on up and down for the same reason as given in plan No. 1, as it allows the juice to follow down in the cracks. We think this silo would cost a little less money than the other plan, but a good many think that the uprights, as described in No. 1, are the best. It is a very simple matter to build a silo from this plan and it can all be done by farm labor. We will give sketch and illustration showing the plan of building. On this style of silo it would be necessary that the silo have some boarding on the outside so as to help support these frames. A good many think it is necessary to board up on the outside and fill in with straw, sawdust or something of this kind to keep the cold out, but where a silo is built in the bay of a barn and has two courses of boards with paper between, there is very little danger of freezing, and it is not necessary to build up from the outside. In building silos on the outside of a barn, the building must be made complete, and greater care should be used on this style of silo than when built in the side of a barn as there is great liability of not getting it strong enough and of the ensilage pressing out. There is also more danger and it must be made so as to keep the cold out. In this style of a silo it is possibly a good idea to have a dead air chamber. This is done by building the silo the same as plan No. 1 or No 2 on the inside of the studding and building it the same on the outside, and if it is built right there will be a dead air space 5 or 6 inches between the walls of the silo, according to the width of studding or uprights used, and this will prevent the cold air from going through and any liability of freezing. We recommend that on all silos the boards be put in the same as in silo No. 1. A good many build silos on the outside in the form of a lean to. This is a satisfactory way and as the

barn furnishes one side it saves a little expense. We have some customers using our cutters who have built very expensive silos, costing three times what was necessary, but it was done from a sense of pride in having everything very nice and all right. We visited a silo in Dutchess County, not long ago, that was built very perfectly, and a great deal of pains had been taken in having everything of the very best and making it very secure and perfect, but it cost at least 50 per cent. more than was necessary. We have visited some silos in Oswego County which were very crude affairs, having been built of rough stock without any particular regard to closing the joints, and then packed around with hay or straw and perhaps coal tar on the inside. These silos proved very successful, but we would not recommend any farmer to build a silo of this kind. It is fair to give a silo the benefit of a reasonable chance, and to do this the silo must be built right. It is a fair estimate in a silo holding less than 100 tons, to figure the cost at about \$1.00 a ton capacity. A silo holding 100 to 200 tons can be built for from 85 to 90 cents per ton capacity. If ensilage is put in correctly and is a success, it will only take a short time for a silo to pay for itself whether it be large or small.

A good many of our friends ask us if it is necessary to build a silo of stone or brick, or if it is necessary to build it under ground. We would recommend that a silo be built above ground in all cases, unless barns are situated on a side hill where it would be cheaper and more convenient to have it placed partly under ground, but from what experience we have had in this matter we find that silos built above ground keep their ensilage very much better. It is not so apt to mould and we think it ferments and comes out better. When ensilage was first used the general impression was that it must be put into a pit, wholly underground. The first silos that we saw were built in this way and some of them were very expensive and some were very crude. The first silo that came to our notice was one built in Maine. It was a square hole in the ground about 12x12 and 8 feet deep and had an old shed roof drawn over it. This was all

there was of the silo. The ensilage was put into this pit and packed thoroughly, and when the writer saw it it was about half full of ensilage and the ensilage was being used every day to feed a large amount of Jersey cattle. As long as it lasted it was good feed but it had a limited capacity of course. The State of Maine now has a great many very large and fine silos. New England has taken hold of the ensilage system more earnestly than any other part of the country. New York State has a great many silos and the system is increasing in favor every day. Last year New England took a new hold and the silo came in favor again very fast. It had dropped out a little in the past two or three years, some of the farmers thinking that it was not what they had thought it to be and had abandoned the idea of building silos. We believe, however, that last year there were more silos built in New England than in any year since the system was commenced. Pennsylvania and Ohio have taken largely to this system of feeding, and in the West it has grown very fast. Last year we had a great many orders for ensilage machinery from Tennessee and Virginia. We think that farmers in that part of the country are becoming very much interested and favorably impressed. Texas also has a few silos, and, as far as we know, they are successful. It is a mystery to us how any man, having over 10 head of stock to feed, can afford to be without a silo. He must surely appreciate the benefits of getting the most product out of the least money, and there is no known method that will produce better results than the system of ensilage.

We have some customers who have built silos by taking 2x4's and laying one on top of the other and nailing to place each one and laping at the corners so that they cannot pull or spread apart, and then lining the inside with tar paper or something of that kind. This we think is an expensive silo, but it is certainly secure and easily built. It takes considerably more lumber, of course, but if farmers are only going to build a small silo, want to build it easily and securely, we do not know of anything that would be any more successful.

We would not, however, recommend this style of a silo to any one who has a very large one to build. We want to caution all parties who contemplate building silos to be particular about the strength. We have known considerable ensilage to be lost by having the silos give out, and spread apart so that the air could get in.

A good many of our customers want to know how many tons of ensilage can be raised to the acre ; how much seed it requires to the acre, and what the relative value is, and the gain, and all of these points. We have some customers that use about 10 quarts of seed to the acre, and plant in rows, as we have before suggested, and they expect to get from 15 to 30 tons of ensilage to the acre, according to the yield and according to the season. If they use the ensilage corn the fodder grows to be from 12 to 18 feet high, and in this way much more can be gotten off of an acre of land than when the common field corn seed is used. We have had a good many arguments with some of our friends on this point, but we find that farmers who are most successful, and are getting the best results from their ensilage, are using the regular ensilage, or, as some call it, the soo corn. This is a sheep tooth, small kernel, and the seed is raised in Delaware. It is the best corn that has ever come within our notice. We do not sell corn, and we are not interested at all in this seed, but the writer has had considerable experience in raising ensilage and putting it up, and has never known of any ensilage that was more successful and more profitable than ensilage raised from this seed. It can be bought of standard dealers in seeds and at reasonable price. We are interested in our friends having good crops and good success with their ensilage and silos. A good many ask us what the gain is by using ensilage. We would like to know in what way 15 tons of nutriment can be gotten out of any piece of land without this ensilage. Of course, the dry fodder can be used, but it does not make as much weight, and has not as much feeding value as the same corn put into ensilage. It is fair to figure that two tons of ensilage is equal to a ton of hay. This

would be equivalent, on the lowest estimate, to $7\frac{1}{2}$ tons of hay per acre; and, on the other hand, cows in milk will do better on ensilage, by 25 to 40 per cent., than they will on any other kind of forage. We have known a great many farmers to feed ensilage in the winter to their new milch cows and to get the same results, or equivalent to the same, as they got from June pasture. If this is true, and we believe that it can be thoroughly demonstrated, then there need be no further argument as to the benefits of ensilage.

Cattle fed on ensilage in the winter look usually very sleek and fat, and always do well. It is not necessary to give them near as much water, and they are not chilled by this. Their product in milk, butter and cheese is just as good as when fed other kinds of grain, providing it is not fed to excess. If a farmer has 50 to 100 tons of ensilage properly stowed away (it can be put in about one-third the space that it could be handled if it was in dry forage) it is very much more convenient in feeding, one man being able to look after the feeding of a good many more head of stock than he could by any other system. If there is any waste it is very easily handled, and it has a thousand benefits that the farmers do not realize who have not made the experiment.

It is not expensive going into the ensilage system. The silo may be built by farm labor, the cost being pretty much all in the lumber and what little mason work is required. Any farmer having 10 cows can afford to build a silo and fill it, providing for 6 to 8 months' feed for his stock. There is no time when he can use this to better advantage, if he has milch cows, than during the season of July and August, when cattle cannot do much except fight flies in the pasture, and get very little to eat. It is the time when farmers have the most shrinkage in their products, and this cuts very deeply into the profits. The writer's experience in this has been that if ensilage is available, so that it can be used in these dry times and when the first shrinkage commences, that many dollars can be saved by feeding ensilage judiciously, together with such other fodder as may be available.

We have one farmer friend in mind, in particular, who was very much opposed to ensilage for a number of years. He finally put in 400 tons and fed 40 cattle, new milch cows mostly, all winter. He was the most enthusiastic farmer we have ever heard, and could talk about nothing else but ensilage. His cattle looked like seals, and he was making better product, and more of it, than he had ever made on any summer pasture. He was making it also at just as low cost price.

Ensilage is the cheapest possible feed, cheaper than pasturing. It is generally known, we think, that cattle tread down in the pasture about four times as much as they eat; this is lost. Our best system of farming now is cattle on soilage. On most of the large sanitary farms and fancy farms the stock are not allowed to go out except once a day for exercise, but their feeding is all done in the stable. Ensilage, or whatever forage is given them, is provided and put away, so that they can be fed the year around in this manner. In some sections of the country it is not the best way to do. In some parts of the South this would, perhaps, not be as beneficial or as necessary.

We will give descriptions of some of the silos that we have seen and the results of the feeding of ensilage. One particular silo we have in mind in Monroe County, N. Y. The cow stables were on level ground, no cellar, and the ground was heavy clay. The stalls and stanchions were built up about six inches from the ground, and the silo was built on a level with this flooring for the stock. Timbers 6 x 8 were imbedded in this hard ground, and staked on the outside, so that they could not move on two sides. On the other two sides the timbers of the barn answered the same purpose, this being an old barn and the timbers being very heavy and strong. Around the outside of these timbers were 2 x 1-inch strips going to the outside edge—that is, on the two sides not formed by the barn timbers. On top of these were placed the uprights, which were 2 x 6, one foot apart, 20 feet long. They were held in place by boarding horizontally on the inside with straight edge hemlock all the

way around and clear up, the uprights, of course, going on all four sides and on the sides formed by the barn timbers; these abutted back against the main timbers at the bottom, and were braced all the way up, so that they could not press out, and at the top a plate put around on the top of all the uprights so as to keep them in place, and back of these plates braces to the timbers of the barn. After going up to the first floor, the cross timbers running each way formed the supports or braces for these uprights, as the silo was just the size of one section of the barn and built in this frame work. This made it perfectly secure in the center and at the top on two sides, and being braced from the floor and roof on the other two sides, the pressure nearer the top was less. After these hemlock boards were put on, there was a coating of tar paper and then matched stuff put on up and down. There was then about a 3-inch cement bottom put in the silo and the ends and boards washed with Portland cement around the bottom edges of the boards. Doors all the way up; one on the first floor on a level with the cow stable, and one above the first floor, and a small door near the top, this being necessary, as the timbers and silo reached closely to the roof. The silo was 15 x 15, and held about sixty-five tons when filled. The cost of it, including lumber and labor, which was pretty much all farm labor, was \$42. The ensilage was cut about the third day of October, and they commenced feeding on Thanksgiving Day. It came out bright and fresh, and there was hardly a pound of it lost. It was weighted thoroughly, and protected on top by about a foot to two feet of straw. This ensilage was raised on two and one-half acres of land and from 800 corn. It was planted in drills, 36 inches between rows, and cultivated until about four feet high. It had very large ears, and the kernels were well filled out and pretty nearly in the glazed state when cut. It had one light frost the day before it was put in the silo, but it did not do any particular damage. Cattle that had been fed on dry forage, after being taken off of pasture, up to Thanksgiving Day had decreased in milk flow 50 per cent., but after being put on to a ration

of ensilage, 40 pounds a day in two feeds, with four quarts of bran, one quart of corn meal, one pound of oil meal to a feed, morning and night, and with good hay at noon, increased the flow of milk to almost the amount given during pasture. This did not apply on the whole stock, but on those that were comparatively new in milk. From tests from this milk and cream—making butter and using the cream for various purposes—there were no ill-effects. No one seemed to discover any difference in the quality of the milk, cream or butter. Every experiment possible was tried to ascertain if ensilage had any bad effects, as was being stated by some of the creamery associations. Customers using this milk and cream particularly were very much pleased with it, and never discovered that it was any different in flavor from that produced by grass pasture. It has been estimated that an acre of good ensilage will keep one animal twelve months. This same dairyman made an experiment of an acre of ensilage corn all ready to put into the silo, but cut it and fed it without being put in. It fed twelve head of cattle thirty days, twice a day, giving them full supply. If it would do this as green fodder, it would do just the same as ensilage, this being equivalent to keeping one cow twelve months.

These are actual tests and experiments, and prove the value of corn fodder, either as green fodder or as ensilage. This experiment was made in September, when pasture was dry and there was comparatively no feed. The supply of dairy products was equal to that obtained when the cattle were getting full feed in pasture. It was necessary, however, to supply a small portion of grain ration with this green fodder. Cattle all looked well and did well. On any other system of feeding an acre of hay or grass will not last an animal over three to four months, and on a good many kinds of land it is considered a pretty good piece of land if enough can be raised on it to last an animal two months. A good many farms do not average in their hay fields over a ton of hay per acre, and that in good seasons. Occasionally it will run two to two and one-half tons, but this is an ex-

traordinary yield in most sections. Farmers who have their lands and farms in the best possible condition, get large hay crops and keep their land up, will hardly believe this, but there are any number of farmers through New York State that will not average one-half a ton to the acre of hay from their meadows.

We have a case in New York State of a silo built by a young farmer just starting in business, and whose brother farmers advised not to build a silo. He was progressive, wanted to start in the business right, and decided that he would go in with modern improvements and arrangements, and built a small silo holding about fifty tons. This was built similar to the one just spoken of, and was built in the bay of his barn, costing about \$45. This cost more in proportion than the one just spoken of, as a good deal of labor was hired specially. This young man commenced feeding his ensilage about the first of December, and having a milk route, was able to supply his customers from his own stock, where thirty days previously he had been obliged to buy, this increase being purely the result of feeding ensilage with grain ration. In talking with him about this silo, he told us that it saved him at least \$150 that year, as he would have had to buy considerable fodder of some kind, and not only that, would have had to buy milk to supply his trade, and by crowding his stock, feeding them ensilage, keeping them in a warm place, taking good care of them, he had ensilage enough to carry him through, and supplied his customers with all the product that they required from his own stock.

These are only a few cases out of a good many that come to our minds, and these are actual tests and experiments made by practical, thorough-going dairymen. The results are what people are after. We doubt very much if any farmer would hesitate to take hold of ensilage and build a silo if he was positive that he could save at least half of his feed, besides getting an increased supply. There are a good many farmers who do not keep their cows in milk during the winter, but depend upon milking them through

the summer and sending milk to factories. They must, however, keep their stock through the winter, and the cheapest way is the best way. There is no way that anybody has ever discovered that cattle can be kept so cheaply and satisfactorily as on the ensilage system. Young stock, fat stock and dry cows, sheep, and in a good many cases hogs and poultry, are fed on ensilage. It is not recommended as good feed for horses, although we have some friends who feed horses a limited amount of ensilage.

To Our Southern Friends.

There come to us every day inquiries from Southern points asking us a great many questions about the system of ensilage; how to build silos, what to put into them in the manner of filling, and various questions that are not covered by most books on this subject. We have endeavored all through this book to cover these points, but we think it is possible that there is some information that we might give to the people in the south that would be more benefit than the information that we have already given. If ensilage is a success and a benefit to them and to the people of the northern and eastern states it certainly can be made a benefit to the people in the south. There is quite a move in Texas toward ensilage. A good many silos have been built, and so far as we can learn they have been a success. We want to create an interest in the southern states particularly in this method of feeding and preserving fodder, for we believe it is going to do a great deal for the people of that country.

In the first place, we understand there is a great deal of forage that cannot be cured by that process. All of this can be cured and preserved by the use of a silo. We would like to urge upon all stock raisers and dairymen in the south to experiment in ensilage, even if they do so only in a small, limited way. For instance, a silo that would hold only a

ton. Some of our New England farmers used a hogshead, and you would be surprised how much ensilage could be put in a space no larger than this, and it would answer as an experiment without any great expense. It would be better to cut the ensilage as it would pack better, especially in a small capacity. This would not necessitate buying a Cutter. We do not expect to sell ensilage machinery to people making a small experiment, but if it is a success and after a time they want ensilage machinery, then we shall hope to stand an equal chance of making the sale. Ensilage put up in the proper way is the cheapest feed ever used by dairymen. Corn ensilage is better, cures better in the silo. A good many use millet, clover, alfalfa and pea vines. Pea vines have been used with great success in the south, and we understand makes excellent ensilage.

After the crop is in the proper condition to put in the silo it should be cut and thoroughly packed, so as to exclude the air as much as possible, and also for the purpose of getting as much into a given space as possible. Corn ensilage should be in that state where the ears commence to glaze, it being the object to secure as much juice as possible, so that the ensilage will be full of moisture when put in the silo. This creates the steaming, or heating process, which cures the ensilage, absorbing the air that is in the spaces, and if it is kept from the air by putting a cover over it, it will keep an unlimited time.

We would like to urge upon stock raisers and dairymen to make an experiment in this small way. It would not be much trouble for a farmer to get a large hogshead and fill it with ensilage. It would have to be filled very slowly, so as to pack it properly and get in a large amount. It can be packed after it is settled and refilled until all is in that can be put in, and then it should be heavily weighted. After it is settled all that it will by the use of the weights the cover may be taken off and may be refilled and weighted again.

We have a great many letters from dairymen who say that if they were positive that ensilage was a success they would try it. They wait year after year and do not become

convinced, simply because they do not know, from their own knowledge and experience, whether it is right. This experiment would satisfy any man whether it was right or wrong. If he would take a little pains to keep track of how much land it would take to raise ensilage forage to fill this small silo, and would keep track of the cost and then also the benefits he would receive from this ensilage, he would very readily discover what the benefits are to him. If they are sufficient to warrant him going on he would then be satisfied to build a silo of large dimensions. This will give you a practical test that will be valuable to you and to your neighbors who watch the experiment. If it is found that cattle can be fed for about one-half the cost by this method than they can some other way any other than this, then it is surely demonstrated that it is a practical and economical way of feeding cattle, providing, of course, stock do as well on flesh, milk and butter products. Some of the most careful and considerate farmers in the United States have made these tests, and in a practical way, so that they knew at the end of their experiment just what they were getting in the way of results, and whether it was cheaper and better.

We hear every day of dairymen and stock raisers who have never heard of this system of ensilage. They know nothing about the requirements or benefits. We have endeavored in this book to give practical information that farmers can use in building silos, raising and putting in ensilage. If there are points that we have not covered we shall be glad to have suggestions or inquiries, so that we may be able to furnish this information, and then when we get out another series of our book on ensilage we shall be able to give the information more complete.

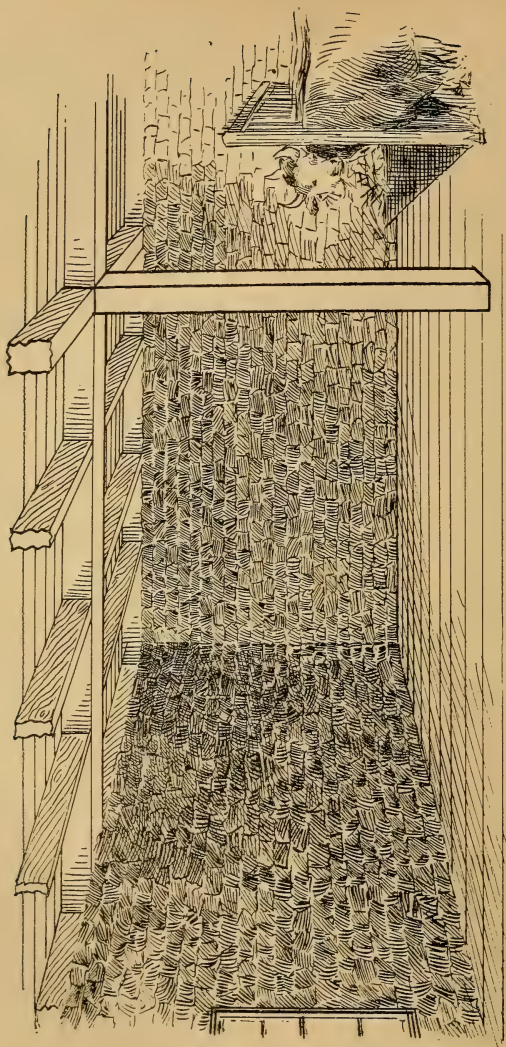
We have a good many friends in the south who have put in ensilage, and who write us very favorably as to the results. We are anxious to get all the information we can regarding the results of ensilage and the silo system in the different parts of the United States. We want this information for the use and benefit of our customers and friends. We shall next year endeavor to get letters from all parts of

the country giving the results of the different experiments in different localities and different climates.

Speaking of the cutting of ensilage, this we believe, and we are assured by all of our friends who have used ensilage for a good many years, that it is the best and safest to cut the ensilage. If it is put in whole it is very difficult to get out nice, more expensive and difficult to pack it, and it cannot be packed perfectly, consequently there is more danger of it spoiling.

There is some expense, to be sure, to fit up an ensilage outfit—power, cutter and carrier—but when it is in full rig and has been in operation one year the largest part of the outfit has been saved, so that in reality there is not much of a loss. The second year will usually wipe out the whole cost of the machinery and silo, so that at the end of the second year the silo system has paid for all the extra expense, and the profits are very great.

We are in the ensilage machinery business, have a full line, and are making our machines in such quantities that we are able to supply the trade at the lowest possible figure for the best goods. We shall be glad to furnish our illustrated catalogue to anyone who is in need of an ensilage outfit. We are glad, however, to furnish any information that we can regarding ensilage or silos whether there is any prospect of our supplying a machine or not.



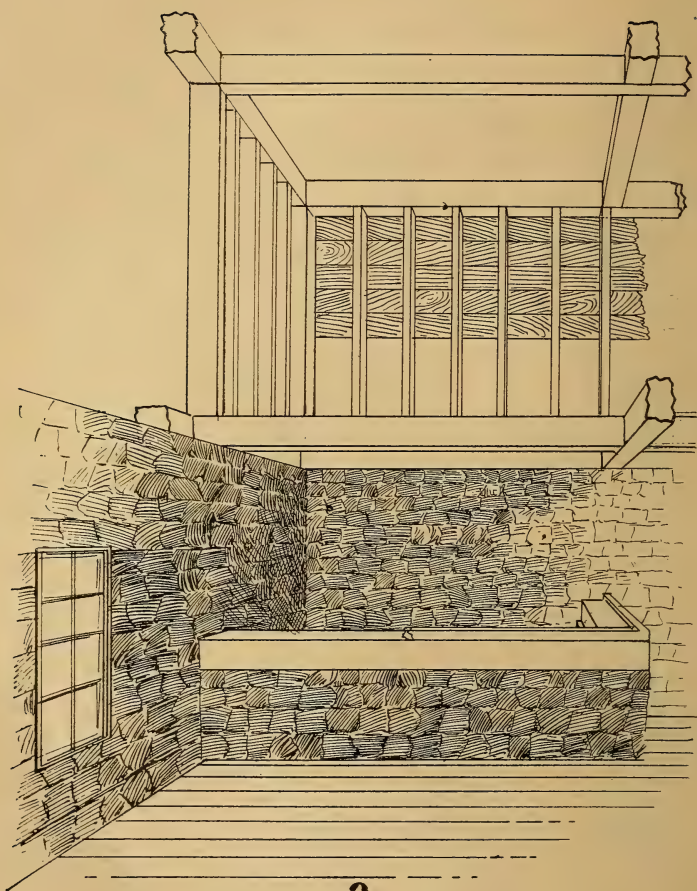
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Description of Cut No. 1.

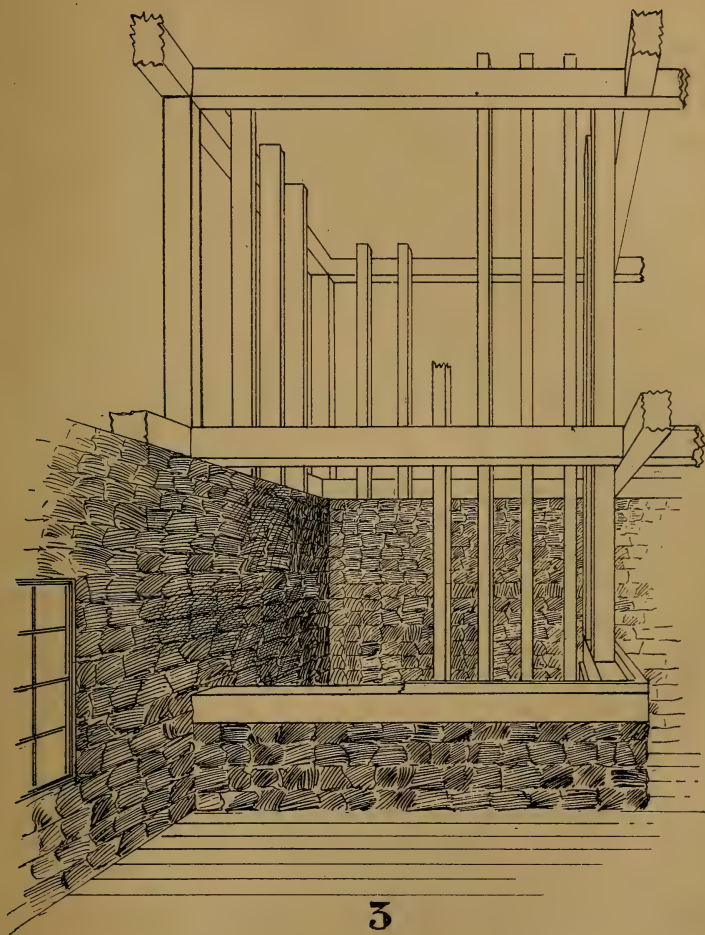
This cut represents basement barn with cattle stables in the basement, showing the frame and flooring of first floor above, and showing the corner walls. It also shows board flooring which is not always put into basement barns. In building a silo this flooring should be removed, and the silo built with the bottom of the silo of clay or cement. It shows post in center of barn coming down underneath cross beams. This beam is not necessary in all barns, but in very large barns it has support in this way. This is designed to show the first starting off of the building of a silo.

Description of Cut No. 2.

In this cut we have endeavored to show the walls that are to be supplied before building silo. It will be noticed that we make a short wall into the barn and across, joining the flat wall as we look at the picture, this forming a square or an oblong according to the way the barn is built. You will notice that the support post has been removed. This is not necessary unless it comes in the way of the wall and decreases the space in which to build the silo. Cuts Nos. 6 and 7, further on, show the plan of this wall, which will be explained later. We want to call particular attention to the timber on this wall being anchored to the wall and with a rib around the outside against which the uprights are placed, these uprights going up inside of the heavy frame work as described in our reading matter. On two sides these uprights go down to the lower wall, and on two sides they rest on the ledge, butting back against the timbers of the frame work. This cut represents the frame work of the first floor and of the second floor up next to the roof, showing the joists of the barn and enough of the boarding on the outside to explain the details of the barn, all unnecessary parts of the barn being left out. We think that this cut is so plain that with the assistance of the following cuts there will be no trouble in understanding.



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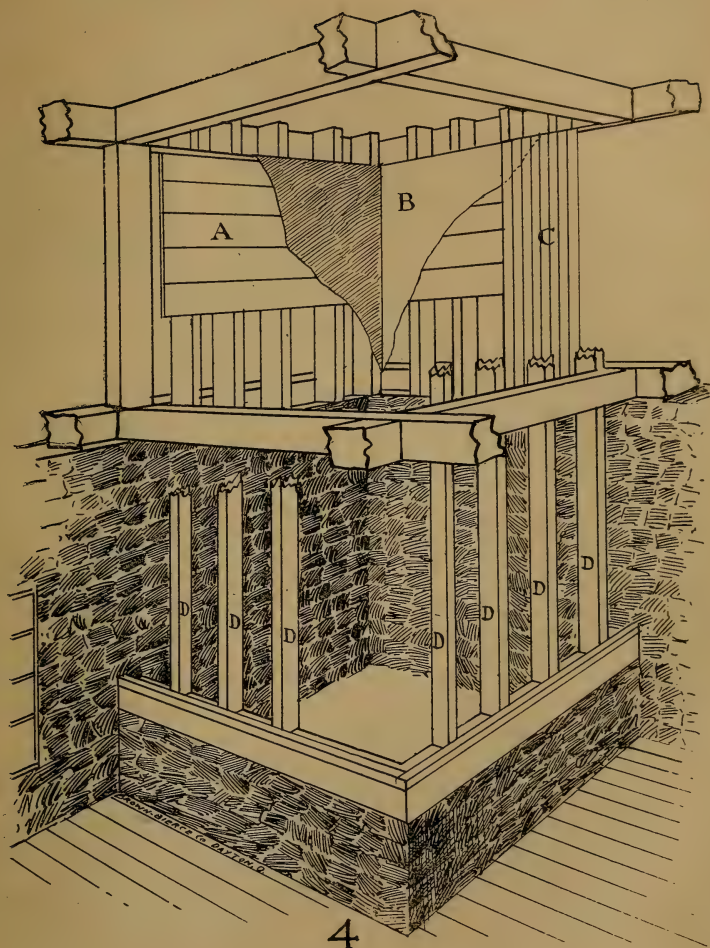


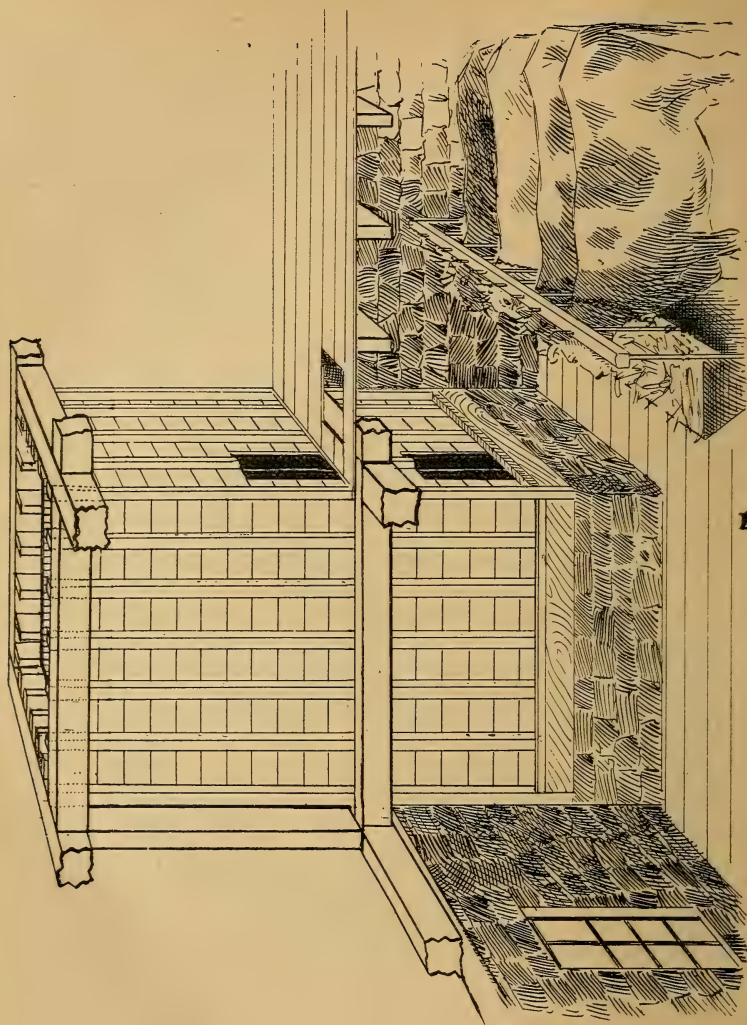
Description of Cut No. 3.

This is a continuation of Cut No. 2, showing the uprights in place on all sides—enough of them to give an idea understandingly so that the silo can be put up in exact detail as per our instructions. It will be noticed that this frame work has no supports underneath the cross timbers in the center of the barn, although some barns are built with them. We leave these out so as to show more completely the arrangement of the uprights. This cut is calculated to give the best idea of the silo frame work of any of them, and will not need very much explanation. We want to say that at the corners the two joists are to come together to form a tight joint, and it is well enough to nail them together to prevent the pulling of the silo apart at the corners, although where heavy timbers are used, as in this cut, this is not absolutely necessary. In joining to the wall the uprights should be secured to the side walls as completely as possible, so that there will be no chance for air to get in or the ensilage to leak out, but by joining the two uprights together at these corners and lapping the boards right, it makes a secure joint.

Description of Cut No. 4.

This represents the silo nearer completion, showing the uprights "D" in place and the boarding and papering of the silo in different stages. "A" represents the first course of boards put on horizontally, showing the uprights behind these boards. "B" represents the paper as put on over the boards "A." "C" represents the last finishing boards running perpendicularly from top to bottom of silo. These boards are of matched stuff, and should run clear to the wall on each side. It is not necessary to board down below the top of the side walls, but the silo should be built so that the last course of boards come out flush with the main walls. It should be a smooth surface from top to bottom.





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Description of Cut No. 5.

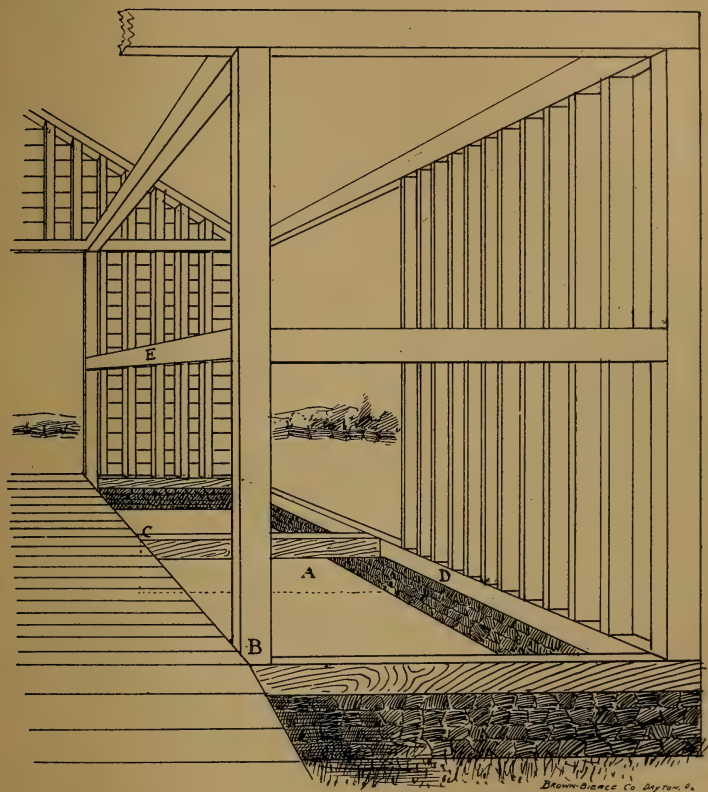
This shows the silo complete, with door at bottom and on first floor for taking out the ensilage. These doors can be put in as often as necessary or as desired, one above the other. In some silos they are made of one continuous door or opening, and slides fitted in so that as many boards can be removed as desired. In some barns these silos can be built still higher, running up into still higher frame work. As represented here the ensilage would be taken out at the lower door first, but a good many prefer to take it out at the top.

Description of Cut No. 6.

Cut No. 6 is an end view of wall showing the timber in place, together with the rib on the timber which the uprights butt back against; showing also the upright, the ends of the horizontal boards and the edge of the upright board. It will be noticed that the timber is left off one inch from the inside of the wall, and that the upright is left back one inch from the edge of the timber with the two courses of one-inch boards, bringing the last boarding flush with the wall. This timber can be put on flush with the wall if desired, and a two-inch space left on the inside of the upright on the timber to take the two courses of boards, this being optional. We give this cut to give an idea of how this is to appear or be made.

Description of Cut No. 7.

Cut No. 7 is a representation of the two walls that are supplied running at right angles with the main walls of the barn, showing anchor irons which are to go up into the timber that goes onto the main wall to hold it in place. We represent here a large timber, 3 x 8, 3 x 10 or 3 x 12 being heavy enough, but a good many of our customers use 6 x 10.



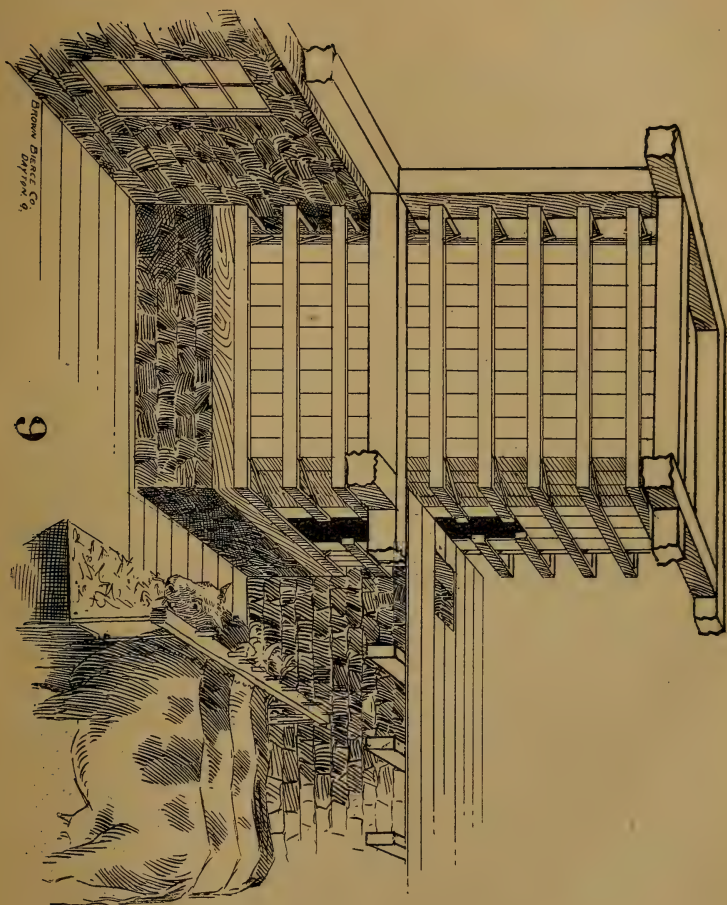
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Description of Cut No. 8.

This represents the frame work surface of barn without basement, and where cattle are stabled on the first or ground floor. This shows two bays with cross timbers, and in which a good many silos are built, showing on the side the uprights. It will be noticed that the beam at "A" runs from the main floor across to the main wall. This is not always put into barns, but for convenience we illustrate it here. Under this beam we would recommend the wall going into the ground six inches to a foot, and from post "B" to beam "C" another wall under this flooring, projecting enough to take the main timber and the uprights, allowing space enough so that the uprights will go up behind beam "E." On the main side and end of the barn timbers will go onto the ledge of the wall and butt back against timber "D," unless, however, this wall is flush, in which case the silo boarding can be put onto the uprights of the barn, provided they are strengthened sufficiently so that they can not crowd out. This can be done by bracing on the outside. The better way, however, is to furnish new uprights, the same as in our plan 2 and 3. A silo built in the bay as shown would be built on the same plan and general idea, our other sketches furnishing the necessary information for this.

Description of Cut No. 9.

This cut represents a different style of silo built by a good many of our practical farmers, the walls and foundation being exactly the same, but using 2 x 6's or 2 x 8's as bands around the silo, boarding up and down to these. These 2 x 6's are supported by nails through the boarding, or can be held in place by short supports between each one. These bands should be about two feet apart. We recommend that two courses of boards up and down with paper between be used in this style of a silo, care being taken to break joints so as to make it secure and air tight. You will notice that this forms not a square silo, but the corners chamfered and braced across the corners of the 2 x 6's so as to make them doubly secure, these braces being sufficiently heavy to take the nails of the boarding.



6

TESTIMONIALS.

OHIO.

Fifty Per Cent. More Feed.

TACOMA, OHIO, February 25, 1890.

The E. W. Ross Co.:

GENTLEMEN—In reply to your letter will say that my silo is of wood, only one thickness of weather-boarding inside. I used hard pine flooring for siding and no paper. The silo is in my barn bay and is 18 x 22 x 28 feet deep. Cost, including all work, lumber, etc., \$128. Filled with a Ross Cutter No 14 A, cut $\frac{1}{2}$ inch in length. Used no weights. Put about one foot of oats, straw and chaff on top. About two inches of ensilage on top moulded. Used southern corn cut when just past the roasting ear stage. I put in 200 tons and filled about September 25th. It was opened December 15, 1889. It did not cost me quite 50 cents per ton to fill, including hiring Cutter, engine teams, and all labor. I am wintering 50 cows and 25 head of calves, and yearlings fed wholly on ensilage for roughage, except a small feed of hay at noon. Stock did well. My cows with 8 quarts of wheat bran and one quart of linseed meal (new process) did as well as on good pastures in summer. Heretofore I have cut my dried corn fodder into $\frac{1}{2}$ inch lengths. I am satisfied that by siloing the corn I get 50 per cent. more feed than by the old way. I think cows should have a small ration of hay or straw or dried corn fodder each day. In making my 50 per cent. estimate in favor of the silo I take into consideration the loss in handling dried corn fodder. With the best care I think there is 50 per cent. gain in favor of the silo.

Respectfully,

L. P. BAILEY.

MINNESOTA.

BENSON, MINN., April 11, 1890.

The E. W. Ross Co., Springfield, Ohio:

GENTLEMEN—We have been experimenting with ensilage for three years, and are fully convinced of its value in this climate, whatever may be thought of it in states where winters are shorter and milder. We believe that it solves the problem of wintering stock cheaply. Cattle, hogs and sheep like it, and thrive on it, and we have fed it to horses and colts for two winters with good results. Our silos are cheap above ground bins, for which portions of buildings already up were utilized. Very truly yours,

WILCOX & LIGGETT.

KENTUCKY.

GAYLORDSVILLE, KY., February 28, 1890.

The E. W. Ross Co.:

GENTLEMEN—I am but a small farmer, but will give you the history of my silo. I at first built a small silo in the corner of my barn, and it pleased me so well that I built another 10x16 and 21 feet deep, and have filled it twice. I shall build another. I used southern white corn, and cut it when in the milk stage. I did not use any weights, and covered with green swale hay. For power I used a two-horse tread and Ross Cutter. My cattle are looking fine, and are in a thrifty condition. My silos cost me about \$100. They are all of wood, with cement bottoms. Judging from my own experience with ensilage, I should say a man can readily keep one cow a year to an acre by the aid of the silo.

Respectfully yours,

CHAS. E. CONKRITE.

From a Noted Stockman.

GUTHRIE, KY., March 10, 1890.

The E. W. Ross Co.:

DEAR SIRs—In answer to your letter will say that my silo is built in one end of my bank barn. The bottom is four feet below the level of the cattle stalls; the lower twelve feet in brick, laid in cement, and plastered with cement. The upper twelve feet is made with two courses of half-inch plank, with tarred paper between the planks, put on up and down; 2x6 streamers on outside; boxing plank put on without stripping. My silo, built in my barn,

40 x 12 x 24 feet deep, with partition, cost \$100. The silage was made from about 150 two-horse loads. Cut it in with a No. 14 A Ross Cutter. I formerly used weights, but do not now, as they are unnecessary. I open silo about two months after filling. The silage cost me about \$3 per ton. I winter about 50 head of cattle (Jerseys). Use cut hay with the silage. It is the best feed I ever used in winter. It keeps the cattle in as good condition as when fed on green pasture. I am very much pleased with the Ross Cutter.

Yours truly,

S. W. TALIAFERRO.

WISCONSIN.

[From Wisconsin's noted dairyman.]

FORT ATKINSON, WIS., May 5, 1890.

The E. W. Ross Co.:

GENTLEMEN—My occupation is that of a dairyman, and my object is to get as large a production of butter from my cows, and at the least possible cost, that I can. For several years my yearly average of butter per cow has been over 350 pounds. Having become convinced that the silo was for me as well as for the other dairymen of Wisconsin, I built a silo last year. I built it of wood, 15 x 16 x 34 feet, and put up 160 tons of ensilage. I began to cut corn when the ears had begun to dent, and cut it into inch lengths when filling. I estimate the cost of my silage at \$1.50 per ton. This silage is fed to 30 cows, and in comparison with any dry fodder which I have fed the silage is the best. C. P. GOODRICH.

A Wisconsin Man's Experiments.

WAUPON, WIS., February 1, 1890.

The E. W. Ross Co.:

I have been experimenting with ensilage for the past three weeks, and will give my experience for the benefit of your readers.

Two kinds of corn were planted, the B. & W. ensilage and the Longfellow, a young flint. The flint corn was cut before there was any frost to speak of and put into the silo, allowing time between fillings for the contents to heat up to 125 or 130 degrees. It was estimated that it would yield about 90 bushels of well-matured ears to the acre. The B. & W. corn was injured by the frost, so that the top leaves were quite dry. The silo filled with this corn was not allowed time to warm at all until the very last. There was some corn, not much, though, and that not matured. When the trial began I had been feeding from the first silo several weeks. The

milk was weighed for 20½ days, twelve days when feeding ensilage made from flint corn and 8½ days on B. & W. ensilage. Grain rations the same in both periods, with the addition of four pounds of corn meal per cow per day during the second period.

First period, 12 days, 2,140 pounds of milk, from which 120½ pounds butter was made, taking 17 pounds 12½ ounces milk for one pound butter. Average yield of milk per day was 178 pounds 5¼ ounces. Average butter yield per day was 10 pounds. Second period, 8½ days, 1,552¼ pounds milk, from which 93½ pounds butter was made, taking 16 pounds 9¾ ounces milk for one pound butter. Average yield of milk per day was 182 pounds 9¾ ounces. Average butter yield per day was 11 pounds. Average yield of milk per day for the whole period was 180 pounds. Average yield of butter per day for the whole time was 10 pounds 6⅞ ounces. Average number of pounds of milk for a pound of butter for the whole period was 17 pounds 4 ounces. The yield of milk was 4 pounds 4 ounces greater per day during the second period, and the butter yield was also one pound greater. It took 1 pound 3 ounces less of milk for a pound of butter when fed on B. & W. ensilage.

W. M. TICHENOR.

MAINE.

ELMWOOD FARM, PARSONSFIELD, ME., March 17, 1890.

The E. W. Ross Co.:

GENTLEMEN—In reply to your inquiries as to my silo, its construction, etc., I will answer as briefly as possible on the different points.

I have a cellar under my barn 10 feet deep, of which I took for my silo two bays, each 12½ x 14 feet. When finished their dimensions were 12 x 13½ feet. I made two silos, one for each bay, from the bottom of the cellar to the first girt in the barn, thus making the entire depth 19 feet. This season I shall build each one nine feet higher. The material used in construction was joists, 3 x 3 inches, boarded with any common inch boards, which were covered very carefully with tarred paper. This I boarded with good, sound pine boards, using care to break joints, as in shingling. Great care should also be used in bracing and staving to prevent spreading. The bottom was cemented, making all air-tight from bottom to top, which is the essential point.

The whole cost will not be more than \$100, as a great portion of the labor was done by my farm employes by odd jobs and during stormy weather. Now I have as good a silo as anyone, as the contents came out in perfect condition. Only two inches on the top were turned dark, and even this was all eaten by my cattle. I used

a Ross Cutter, putting in 25 tons per day. First one was filled, then the other; but a better way I think would be to put into one on the first day and into the other the next, thus continuing until both silos are filled. This being done I put on oat straw to the depth of about a foot. I opened one silo on November 10th and commenced feeding my stock (32 in number and of different ages, from calves to three-year-old steers and cows), giving on an average one bushel a day to each animal. My method of feeding is as follows:

At morning feed twice on silage, one basket to three animals each time. At noon feed once on unthreshed oats. At night feed once on oat or rye straw and once on silage, one basket to three, thus getting in the bushel to each animal. In addition to the corn in the silage my steers and cows have had for grain three quarts of shorts, and the calves have had a little oats added with shorts a part of the time. They have made a better growth, and are in better condition than ever before at this season of the year.

I am unable to speak of the merits of silage as food for dairy stock, as my business is stock raising, both cattle and horses. I am perfectly satisfied with silage as a cheap and abundant food for young and growing animals. I am satisfied that with the silo I can double the carrying capacity of my farm. I figure the cost of silage at \$1.75 per ton, which is about as low as it can be produced upon our New England farms. I value 2½ tons of my silage against one ton of best hay.

Respectfully,

J. W. COOK.

BIDDEFORD, ME., February 24, 1890.

The E. W. Ross Co.:

Yours of the 22d at hand. Would say I have been using ensilage five years. My silos are cheap—built with stone under the sill. From the sill to the high beams, double-boarded and paper between. Capacity, 100 tons, which I grew on eight acres. I am very much pleased with the silo, and would not think of doing without it. I keep 18 Jersey cows, make butter altogether, for which we get 35 cents per pound. We feed one feed in the morning and one at night with a small amount of grain, and one feed of hay at noon. We use Blunt's Ensilage Corn. It takes about five days to fill our silo. We cover immediately with double boards, and shovel on a layer of dry sand. We do not lose any silage to speak of. We feed silage until the last of May. On silage our stock gain in flesh all winter. I estimate that our silage costs us \$1.50 per ton. I use a Ross Cutter, and call it a most complete machine. Quite a number of our best farmers in this vicinity feed silage with the very best results, both for butter making and for milk.

Yours respectfully,

D. A. BURNHAM.

J. E. Rodger's Experience in "All the Year Round" Feeding Silage.

BINGHAMPTON, N. Y., April 21, 1890.

The E. W. Ross Co.:

DEAR SIRS—Your letter received. I am glad to answer your questions so far as I understand the facts wanted. We feed ensilage to our cows the year round. We keep an average of about 100 head or more in the winter, and less in the summer. Our stock is in fine condition. We turn from 30 to 40 head each year for beef, which are fattened while we milk them. We allow our best cows to come in, with us. The grain ration for the past two years has cost us for cows for the year \$25.53. The grain is gluten meal (in damp state) and cotton seed meal. This grain ration and about 50 pounds of ensilage per day has produced in 1888, 3,041 quarts of milk per cow for the year as an average of our dairy. In 1889 the average per cow was 3,175 quarts of milk. This year we hope to make it 3,300 quarts per cow. I know of no dairy of native cows that has, on dry feed, produced this amount of milk. Our cows are not pastured, the feeding of silage being continued throughout the year. Our average yield of corn is about 18 tons per acre. We have settled on the Leaming corn as the best for this locality. We use 8 quarts of seed per acre. Our silos are 30 feet square inside, and 24 feet deep. We fill as fast as we can, putting in 70 tons per day. The silage is sweet to the smell, but somewhat tart to the taste. There is some loss from several causes, possibly 15 per cent. From our experience no man has any business to pasture land worth from \$50 to \$100 per acre, or land that will produce 15 tons of silage corn per acre. The silo, we find, enables us to keep three times the stock that we could on the old plan. Very truly yours, J. B. & J. E. RODGER.

From T. W. Skinner.

MEXICO, N. Y., April 4, 1890.

The E. W. Ross Co.:

GENTLEMEN—Last year, having bought the old homestead, where I helped my father clear the land over fifty years ago, I was told by my neighbor that if I made a success of farming in these times I must build a silo and raise corn enough to fill it. As the farm is what is called a dry farm, not adapted to grass, I at once set about building a silo by changing a 15x30 foot bay into one, first laying a good wall with mortar up to the sills, about two feet. Then put in sufficient girths between the posts to make it strong. I then boarded it up all around on the inside with hemlock boards; then a course of heavy tarred paper, then another course of

hemlock boards. I had a partition in the middle, making two silos of 14 x 14 each. These opened by doors upon the barn floor, from which the ensilage is fed to 20 cows, who stand about the silo in the form of an "L." The cost was less than \$100, and was filled with corn cut with one of your No. 14 A Cutters, the power being a four-horse Sweep, also bought of you. Only three horses were used. The corn was drawn and silo filled gradually, as a man would do his other farm work. No weights were used. When filled a quantity of swale grass was cut and put on top. The corn was well glazed. Each silo would hold 60 tons, and one was opened when the cows were put up for winter. Four kinds of corn were planted, to-wit: Pride of the North, Selzer, Southern "Soo" and Sheep Tooth corn. The Pride of the North was the only one that had ears of any amount, and another year shall plant Pride of the North and the improved Leaming. As the work was all done by man on farm and without hiring I could not give the expense per ton of storing the ensilage. I am feeding 20 cows, and they have hay once a day, and are in fine condition, and will give more milk on ensilage than on dry fodder. The No. 14 A Cutter and Horse-Power are just the things to have on a farm. A farmer can cut his ensilage at his leisure, and also his corn stalks and his straw in the winter.

Yours truly,

T. W. SKINNER.

PENNSYLVANIA.

Important Testimony from Edgar Huidekoper.

MEADVILLE, PA., April 4, 1890.

The E. W. Ross Co.:

DEAR SIRS—In reply to your letter, I did not weigh my corn fodder as it went into the silo, nor did I keep accurate account of the amount put up of the different lots, but I know some things about it which, if not concerning details, is concerning general results. My ensilage corn had to be planted a second time (B. & W. corn). The second planting was on May 20th. It grew well—made a great crop. Seven and a half acres of it filled a silo 19½ feet square, 16 feet deep, but it was not sufficiently mature September 26th to 31st to make the best of ensilage. On October 7th we began putting the balance of B. & W. corn into the new silo, and this lot comes out better. September 23d, 24th and 25th my men cut up some field corn which was husked later. After getting the B. & W. corn into the silo the men cut up all the field corn on October 4th and 5th and shocked it October 7th. They began putting this into the silo, and it made extraordinary fine silage. It came out amber color, sweet and in splendid form.

Then we were delayed until October 21st. On that day until the 24th we put into the silo the field corn that was shocked up September 25th, part of it being husked. This silage came out of the pits this winter in a darkened state as to color, but it fed well. During the filling of this silo we sprinkled it down with several barrels of water. There was some loss, but not much in the aggregate, mostly at the top and corners. This was due, I think, to insufficient treading and not enough wetting, which would have produced more heat, and so secured better settling. I do not think the loss so great as it would have been if I had left the corn stalks in the field, or tried to house them some other way. Much of the B. & W. ensilage corn had splendid ears ready for table use, but I was satisfied the corn should be ready to husk to give best results, and I would prefer to cut some of the field up and shock it than to put it in before it gets to the husking condition. This season I propose to plant several kinds, B. & W., Yellow Dent, Leaming, etc., and keep the B. & W. to cut into the silo along with the dryest toward the end. I think the B. & W. being green will have enough water to spare some to the dry stalks which will go in, with alternate loads, and thus be an advantage to both, and the dry will not require to be sprinkled. But the season and condition of the corn crop will determine me in some respects when the time comes. I think we should put oats into the silo to save buying bran, and see if this expense cannot be avoided. When we were putting the field corn into the silo my neighbors thought me a fool to spoil such a splendid crop, but they now admit it was a good thing. This season I shall put enough ensilage to feed from August to June, and put the silo to a further test and see if it is the best way to soil my stock.

Yours truly, EDGAR HUIDEKÖPER.

PHILADELPHIA, PA., February 24, 1890.

The E. W. Ross Co.:

GENTLEMEN:—I have used ensilage for the past ten years with good results. My silo is built of stone on a side hill, filling on the upper side and taking out on the lower side. The inside and bottom are cemented. The bottom has an incline to the extreme end, with a small dish in the ground for any juices that accumulate to run off. The walls are 16 to 18 inches thick, well laid in mortar. When thoroughly dry put on the cement, two layers, after an interval of several days (each layer). I use southern field corn planted in drills, and when the ear is in the milk cut and fill leisurely, treading down as filling. After nearly full let it settle three or four days, and then fill up above the plates on wall and let it settle until even with plates. Then put on a layer of chaff corn with plank and put a few good-sized stones on each plank. As you take out the ensilage at one end cut it down as you would hay, and place the plank and stone on plates, to be ready for another season. I feed to

my milch cows two rations a day of a half bushel each, mixed with one quart corn meal and three quarts bran, well mixed; one ration of hay at night. My cows come out in the spring with a sleek coat and in fine condition. I consider ensilage a fine food, fed as above.

I have written more fully than I anticipated when I began this letter, as I have had a long experience in this feeding, having a dairy of 125 cows. I take great pleasure in giving my testimony in favor of ensilage.

Very truly yours,

J. E. KINGSLEY.

FROSTBURG, PA., March 15, 1890.

The E. W. Ross Co.:

I shall only speak of what I have learned by actual experience, extending over five years, during which time I have spent considerable time, labor and money, with diversified results. In this essay I shall only give you the conclusions at which I have arrived, and by which I expect to govern my practice in the future.

I think I can raise 10 tons of ensilage on the same land that would produce one ton of good hay.

Two tons of ensilage has a feeding value equal to that of one ton of good hay.

All kinds of stock will eat ensilage in preference to hay.

A ration composed of two-thirds ensilage and one-third dry feed and grain will keep stock in as good condition as it is possible to keep them on dry feed, and will not cost half as much money.

All farm stock will eat a good ration of ensilage daily for any desired length of time without becoming tired of it or experiencing any bad results therefrom.

I have fed it to cows in all stages of gestation without any evil effects.

The silo may be filled fast or slow, as is most convenient, and the ensilage harvest may extend through several weeks if so desired.

Feeding may be begun in six weeks from time of filling the silo, or may be deferred any length of time desired.

Ensilage is as good feed in summer as in winter, and is therefore a safeguard against frost or drought.

The feeding value of a crop is not increased by being placed in a silo; but is preserved in succulent palatable form, and stock will do as well when fed good ensilage at any time of the year, as they would do if fed a like amount of the same crop when in the condition in which it went into the silo. This fact enables the farmer to provide for his stock a supply of feed sufficient to last the entire year, and answers the same purpose that pasture does during a few weeks in summer. It also gives all the advantages of soiling in summer,

without the objectionable feature of having to cut and haul in the needed supply each day, regardless of condition of weather or pressure of work.

JAS. MCCRACKIN, JR.

FRANKLIN, PA., March 17, 1890.

The E. W. Ross Co.:

GENTLEMEN—In the spring of 1888 I concluded to build a silo. Never having been inside of one and only once on the outside, I had to depend principally on my own judgment, and what information I got from your book on Ensilage and Silos, and Hoard's Dairyman. My building is $23\frac{1}{2} \times 37\frac{1}{2}$ feet inside; set on a good 6 feet stone foundation laid in cement. Commenced feeding eight weeks after silo was filled. It was taken out by beginning at one end of the pit and cutting it down as needed. It looked brown when it came out, but on close examination I found a green tinge in it and can hardly say whether it was a dark green or a light brown. It was almost sweet, and every animal on the farm, that could get it, ate it. The cows increased in flow of milk as soon as they began eating it. I never used feed that seemed to please the cattle so well, or that kept them in as good condition. I do not think that in 1888 I lost 5 per cent. of the corn in the silo and in feeding it out. I am not able to tell what ensilage cost me per ton, but am satisfied that the cost, although usually under-estimated, is less than that of any other feed equally as good, and that there is no other food as good for milch cows or to raise calves on. I raised fifteen heifers last year and when spring came they looked fully as well as they did in the fall, if not better. My first year's experience with the silo was an undoubted success, and the No. 17 Cutter was all I needed and gave me entire satisfaction. I was so much pleased with my success in 1888, that I built another pit $16 \times 27\frac{1}{2} \times 16$ feet deep in 1889, and concluded to feed ensilage almost exclusively. I planted 20 acres of corn and as I had 10 acres of bigclover, I concluded to put it into the silo. I cut the clover, although it was a job. I also put in about eight acres of heavy oats, cut when it was just about half-colored. Put both clover and oats in without waiting for them to wilt, and some of the oats was wet with dew. I can harvest and cut oats into the silo cheaper than I could cut and thresh them, and by putting them into the silo I can be almost independent of the weather. They made excellent feed and I expect to put in more oats the same way. If this is done well and the pits covered with either grass or earth (dry straw is no good), (I elevated the earth with my Ross Carrier) so that the heated air cannot escape or the cold air get in, there need be little, if any, loss in filling clover or oats into the silo. This year I shall plant 25 acres of corn for the silo, and should my oats prove to be heavy or the season unfavorable, I will also put them in. It is not expensive and I can soon build another pit if I need it. About farming and stock feeding, one thing is certain; if we cannot

make it pay with the silo, we surely cannot do so without it. Our Cutter is just the thing, but every man should have two sets of knives if he cuts clover, so as to keep one set sharp, as the grit in the clover and the hard stalks will take the edge off of any knife ever made. One set does nicely for cutting corn.

Yours truly,

S. P. McCALMONT.

MARYLAND.

GAITHERSBURG, MD., February 10, 1890.

The E. W. Ross Co.:

DEAR SIRs—My silos are above ground structures with 3x10 studding lined up inside with two thicknesses of yellow pine, with lining of tarred papers. The floors are simply packed clay, coming up on the inside to top of the sills. I have four pits 12x14, and 10x12, and they cost me complete, \$250. I do not use any weights. Two of the silos were not covered at all, and two were covered with a little straw on which a few cords of stove wood was thrown. I usually open one of them about eight weeks after filling. My stock is in excellent, thriving condition. Dry fodder has no comparison with good silage. I am feeding 40 head of stock. Have used the silo for four years.

Yours truly,

N. D. MUNRO.

GAITHERSBURG, MD., March 17, 1890.

The E. W. Ross Co.:

GENTLEMEN—In reply to your favor of the 6th inst. would say I have been using ensilage two years and do not know how any farmer can keep cows economically without it. My silo is built in the barn all above ground. I used a part of my driveway. Size of silo, 8x13x14. I inserted some extra studding in the barn frame and lined it on the inside with double white pine-boards one inch thick by twelve inches wide, with building felt between boards. I laid the boards horizontally for the reason that the air is by that means prevented from entering the silo when filled, as it would do were the boards put on perpendicularly. It is a mistake to suppose that a building in which to preserve ensilage must be expensive. Mine cost about \$25, and my ensilage is perfect, even to the very boards. I filled it in three days with the assistance of five men and four horses; two horses at the power, the other two at the wagons, cutting up one load while the team drew another. Three acres produced enough corn to fill the silo which holds, according to the estimated weight per cubic foot, about 40 tons. The corn was planted three feet one way, and from 10 to 12 inches in drills. I think, had it been husked, it would have yielded fifteen barrels per acre. No one should plant corn for ensilage too thick to produce a heavy growth

of ears, as well as fodder, for it is safe to presume that a stalk, which has one or two heavy ears of corn on it, has more nutriment than the same weight of thin, spindling fodder, without ears. I prefer to cut my ensilage when the grain has just left its milk state. I feed bran with silage, and a little dry corn fodder at noon. I put the cost of my silo at \$1.00 per ton. If I had to return to the old ways of keeping cattle, I would quit the business. In building a silo, care must be taken to keep the rats from burrowing through the bottom.

Respectfully yours,

C. E. MEAN.

VIRGINIA.

Mr. Gray's Views.

RICHMOND, VA., March 19, 1890.

The E. W. Ross Co.:

GENTLEMEN—I first built a "dug out" silo in a clay bank some ten years ago, and filled with cut fodder, covering it with a layer of clay. I then built a stone silo 12 x 12 x 32 feet, costing \$400, but the silage in it did not keep as well as that in the clay bank. With later experience I think a silo should be built for \$1 per ton capacity. I find that corn, to make best ensilage, should be in the roasting stage when cut. I prefer to shuck my corn and let it stand a week and harden the sap before cutting it into the silo. I think it makes sweeter silage. Corn should be grown and all expenses added and put into the silo at a total cost of \$2 per ton for the silage. Beef cattle and milch cows changed from silage to best dry corn fodder, and no change in grain, will at once commence to fall off in flesh and milk. Had cows so fed shrink 25 per cent. in milk and butter.

Yours truly,

F. GRAY.

Virginia Agricultural and Mechanical College— Experiment Station.

BLACKSBURG, VA., February 28, 1890.

The E. W. Ross Co.:

GENTLEMEN—Yours of recent date came duly to hand. In reply I state the following facts, which may be of interest to you:

Method of Construction—Our silo is built upon a strong clay soil, which is dug out to the depth of two feet, with solid bottom of concrete plaster. Brick walls twelve inches in thickness were run up twelve inches above the ground. Upon this were laid in cement stringers of white oak 12 x 12. In these stringers were uprights of

19 feet, 4x4, placed twenty inches apart, an ordinary roof being placed upon this. The walls of the silo were of double plank, and sawdust rammed compactly between. It has answered our purposes admirably so far.

How Filled—The silo was filled by cutting the stalks to half-inch lengths with the Ross Cutter, using the elevator, or carrier, to dump the matter thus cut into the receptacle. We cut daily until we had filled the silo to a depth of $3\frac{1}{2}$ feet, when operations were suspended until the temperature would rise to about 132 degrees, when operations would be resumed. The substances used in filling were cut the day preceding and allowed to lie in the field and wilt slightly before being hauled up and deposited in the silo.

Amount and Kind of Weights Used for Pressing—We placed upon the upper surface of the silage a piece of parchment paper, covering it completely; upon this ordinary inch boards nicely adjusted, so as not to open or hang upon the walls, and so placed as to break joints. Upon this we put a weight of stone of about thirty pounds to the square foot. Cost of silage, \$1.50 per ton.

Condition of Stock—Experience has shown us that there is a great advantage in using silage as an adjunct to dry food with store cattle and milch cows, and that for young and growing cattle, when fed alone as a long feed, with a proper addendum of corn, there is no equal to it. For ewes and store sheep during winter and spring there is nothing, in my opinion, so good.

Comparison Between Dry Fodder and Cut Silage—To answer this question would require a considerable amount of work, which, I am sorry to say, I am not able to do at present. I would state, however, that the analysis of the silage made here upon the plants which we used has shown that we get a larger per cent. of dry matter than is shown by any analysis upon which I can lay my hands. The nutritive ration, however, is wider, and seems to require a considerable addition of nitrogenous matter.

Very cordially,

W. B. PRESTON.

Director.

SPOTTSYLVANIA COUNTY, VA., March 25, 1890.

The E. W. Ross Co.:

GENTLEMEN—In reply to your letter would say our silos are three in number, 30 x 15 x 21 feet deep, side by side, with door openings on to feeding floor. We built on hillside, and the first nine feet are concrete sixteen inches thick; above that framing, with dead air space, two thicknesses 1-inch boards with tar-paper between. The silos occupy one-fourth of the space of a \$5,000 barn, and we can give no separate estimate of their cost. We fill slowly and let it get very hot; pack well in corners and cover with two feet of green weeds, put on in layers and tramped. Use no other weights or cover

and do not lose an ounce weight, there being no trace of mould. We aim to have our fodder fully mature and put up 400 tons. We begin feeding at once and find no harm in it. We use Southern White corn mostly, but mix in cow-peas and Sojo beans, the latter making prime ensilage. We run a winter dairy of Red Polled cattle, and are convinced that without ensilage we could not manage at all. We have been feeding ensilage five years, and each year like it better. It is as sweet as honey and the cows thrive on it amazingly, giving quite double the amount of milk. We use a Ross Cutter for corn, cutting $\frac{1}{4}$ -inch, and desire no better machine. We have a 26-foot angle Carrier, with 32-foot extension, and can change into any one of the three pits in two minutes. Our cutter is stationary in the barn, belted from a main shaft, and we run the carrier also direct from the main shaft at a less rate of speed, one-half, than when geared on the machine itself; this, where practicable, is a great improvement. There is no going back on the Ross Cutter.

Yours truly,

PIERSON BROS.

WEST VIRGINIA.

MARTINSBURG, W. VA., March —, 1890:

The E. W. Ross Co.:

GENTLEMEN—I built a silo in the summer of 1888, 21 feet square by 22 feet deep, dividing into three pits; one pit $10\frac{1}{2} \times 21$ feet, the other two $10\frac{1}{2}$ feet square each; the small pits being for spring feeding when it is not desirable to have too large an area of ensilage exposed to the warm weather. I built a stonewall 8 feet high and on it placed a 14-foot frame, double-boarded with paper between the boards, cemented the walls but will line up with boards next the walls the coming season, as the silage keeps much better against the boards than it does against the stonewall. I think it is no exaggeration to state that I get more feeding value out of one acre in the silo than I did with two acres the old way, for corn can be cut and placed in wagons in the field as cheap as it can be cut and shocked (and corn once on wagons, the hardest work about ensilage is over,) then corn can be hauled from the field and run through the cutter and elevated by a carrier to the pits as cheap as it can be shocked and fodder tied in the field; the ensilage having the advantage in cost over the cut and dried process of picking up the shocked corn in the field and loading on the wagon, unloading at the crib, loading and unloading the fodder, cutting the fodder and crushing the corn. The hauling is not taken into consideration, costing about as much by one process as the other. In conclusion I would urge upon every farmer to give the silo a trial, and they will find, as the Queen of Sheba did of Solomon's glory, that "The half has not been told."

Yours truly,

C. A. WEVER.

FROM THE EMPIRE STATE.

[From Dairy Commissioner J. K. Brown.]

ALBANY, N. Y., April 8, 1890.

The E. W. Ross Co.:

DEAR SIRS—In response to yours of the 3d instant permit me to say that our progressive dairymen have given the subject of silos careful attention, and hundreds of new ones are to be built this season. Old prejudices are fading out, and the silo is now regarded by our most intelligent farmers as a necessity. In fact, it is difficult to see how dairying can be made at all profitable in our climate without a good well-filled silo for winter use. Our experience has not been as extensive as that of some others, but so far we have found it all that its most enthusiastic friends claimed it to be. The silo alone will not make a dairyman rich, nor add largely to his income, but by having the large quantity of cattle food which can be cheaply provided by using the silo, and then by feeding such cheap products as wheat, bran, middlings, etc., he can profitably keep a much larger herd, and steadily and surely increase the fertility of his farm. I believe the silo to be a good thing for both the farmer and the farm.

Yours very respectfully,

J. K. BROWN.

One-Fourth More Butter.

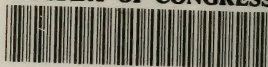
RODMAN, N. Y., ——— —, 1890.

The E. W. Ross Co.:

GENTLEMEN—I built a silo last season. Its dimensions are 24 x 30 feet, and 25 feet deep; capacity, 300 tons. It is built of stone to a height of 13 feet, remainder of wood, and cost \$800. I planted eighteen acres of corn, mostly of common field variety, which yielded an average of 12 tons to the acre, very rich in grain. I consider two tons of ensilage as worth one of hay. Filled my silo very slowly, giving ample time to heat. Opened one-fourth of silo November 1st. Found the ensilage in prime order, being perfectly sweet, except two or three inches next to the wall. I am feeding milch cows 45 pounds per day in three feeds, with from three to four pounds of hay and two pounds of ship stuffs. Am making one-fourth more butter on this feed from the same cows than I did last winter, when I fed 12 pounds of corn, oats and wheat, ground and mixed, together with all the good hay the cows would eat. Have a dairy of 20 cows, mostly fresh. Never had them to do so well. Ensilage is a success with me so far, and I do not think any dairyman can afford to do without a silo.

N. D. RALPH.

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